Research Division

Tools for Better Transportation Tomorrow

PROJECT DEVELOPMENT
Providing Your Project Needs

The UDOT R&D Newsletter | What's Hot | In The Know | Completed UDOT Research | Need a Literature Search? | **December 2006 Edition**

Utah Department Of Transportation

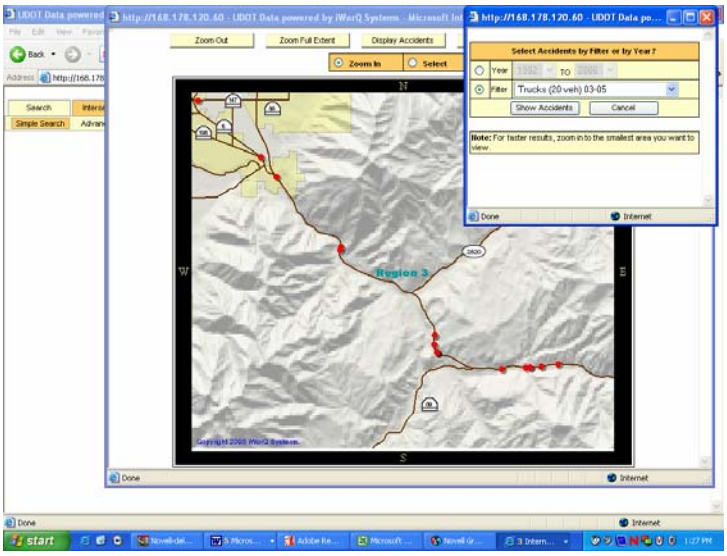
What's HOT

GIS Research at UDOT:

By: Ken Berg, UDOT Research Division

What Is GIS?

A geographical information system GIS is a way of making a "smart" map. Anything that takes up space and has useful information related to it, can be "GIS-ed". Examples are many and widely varied including trees in a forest, equipment in a building, homeowners in a city, electronic components in a circuit board, customer demographics for a businesses, etc. Users can view, query and analyze the data on a map to help them manage assests, improve customer service and make better decisions.



GIS in Government

In government organizations at all levels GIS is becoming essential to just knowing where things are and what is going on. Government decision makers are using geography more and more to manage infrastructure and communicate with their customers. Available case studies illustrate the flexibility and power of GIS in government.

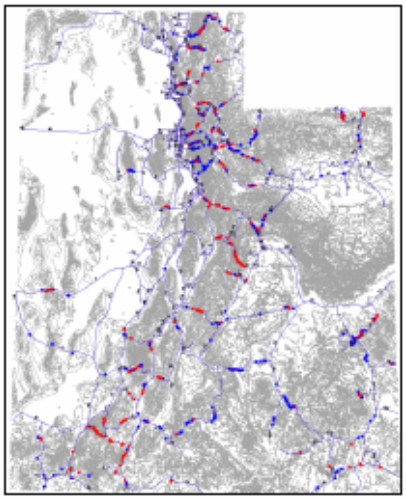
GIS and the Research Division

The Research Division currently has four GIS related initiatives in different phases of progress:

Accident Records -The UDOT Data Almanac is GIS enabled. The crash data can be posted to the map and further queried geographically. Also the data can be queried initially using GIS. For example any type of crash (pedestrian hits, truck related, fatal, etc.) can be accessed by putting any map on the screen and hitting the button. We have about 120 experts with login IDs at UDOT, FHWA and the MPOs. The data is used to determine where improvements are needed, to help select the proper fix, and to measure the effectiveness of the improvement over time. The Figure above shows truck related crashes using the Data Almanac GIS Application

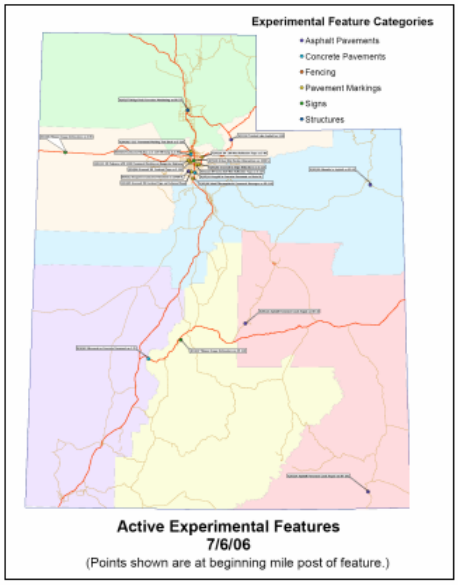
Garyn Perrett (iWorQ Consulting) and Chris Glazier (ETS) developed the system and Doug Anderson (Research) championed and managed the project. Contact Doug if you would like to know more about accessing the data.

Rock falls - A recent study catalogued all of the sites where rocks fall on our state highways, and prioritized them according to their relative risk. The data is contained in an Access database file, and is GIS enabled, which allows the rock fall sites to be displayed on corridor or regional maps. The Geotechnical Division manages the database, and provides support to project managers, design managers, maintenance supervisors and others who deal with rock fall hazards. They can assist with identifying hazard locations, evaluating mitigation techniques, and prioritizing resources. The Figure to the left shows Rock Fall Sites:
Red=High Risk Blue=Medium Risk
Leslie Heppler and Grant Gummow (Geotechnical) championed the project. Dr. Robert Pack (USU) developed the system, Clifton Farnsworth and Blaine Leonard (Research) managed the project.



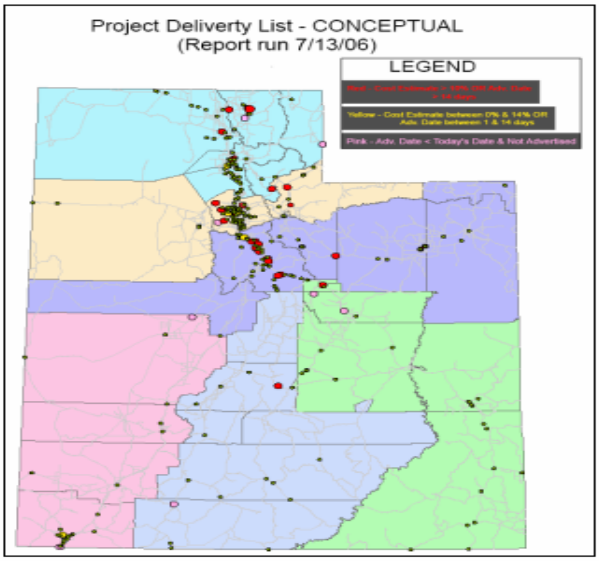
Rock Fall Sites
Red=High Risk Blue=Medium Risk

Map of Experimental Features – A statewide map of experimental features is still being tested and developed. Each feature symbol on the map will be hyperlinked to a web page containing a short description of the test section with downloadable related reports and other documents. A demo version of the map has some of the features hyperlinked. A fully developed version went live at the end of October 2006. The Figure to the right shows the Map of Active Experimental Features.
Ken Berg (Research), with the help of Barry Axelrod (Engineering Services), Chris Glazier (ETS) and Tom Lind (Maintenance), developed the map and added the web content.



Active Experimental Features
7/6/06
(Points shown are at beginning mile post of feature.)

The STIP in GIS – A new research study, GIS Project Tracking Website, was prioritized at the UTRAC workshop this year and funded for the ETS Division. Projects at all phases of development, from STIP development through construction completion will be able to be viewed and queried. Project coordination and communication to all stakeholders will be improved when projects can be viewed graphically.

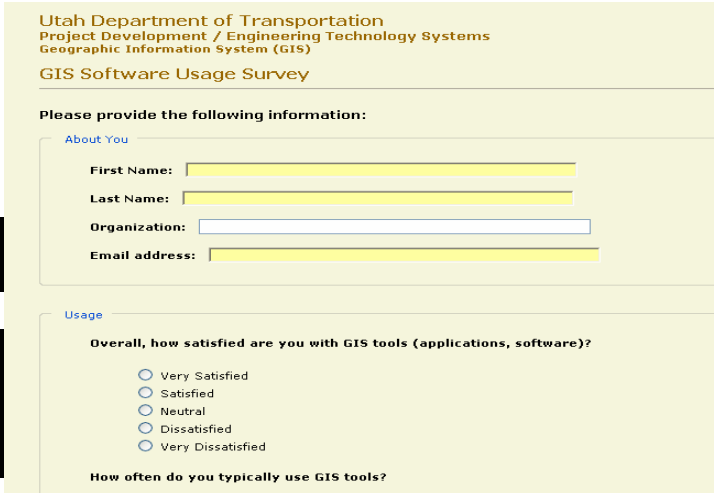


The project Technical Advisory Committee (TAC) has reviewed the problem statement and decided to develop an RFQ to select a consultant to build this site. Mr. Craig Hancock, Director of Engineering Technology Services (ETS) is championing the project and Mr. Ken Berg, Research Development Engineer is the project manager.
Craig Hancock, (ETS) is championing the project and Ken Berg (Research) is the project manager.

GIS User Assessment Survey

As part of an overall assessment of the utilization and importance of Geographic Information System (GIS), the Engineering Technology Systems Group (ETS) is conducting a preliminary survey to determine the current state of the usage of GIS software within UDOT.

If you use GIS software, please visit the online survey at:
http://168.178.125.90/GisSurvey
And take a moment to answer the questions on the form and submit them. Your time and effort will be greatly appreciated.


Utah Department of Transportation
Project Development / Engineering Technology Systems
Geographic Information System (GIS)

GIS Software Usage Survey

Please provide the following information:

About You

First Name:
Last Name:
Organization:
Email address:

Usage

Overall, how satisfied are you with GIS tools (applications, software)?

- Very Satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very Dissatisfied

How often do you typically use GIS tools?

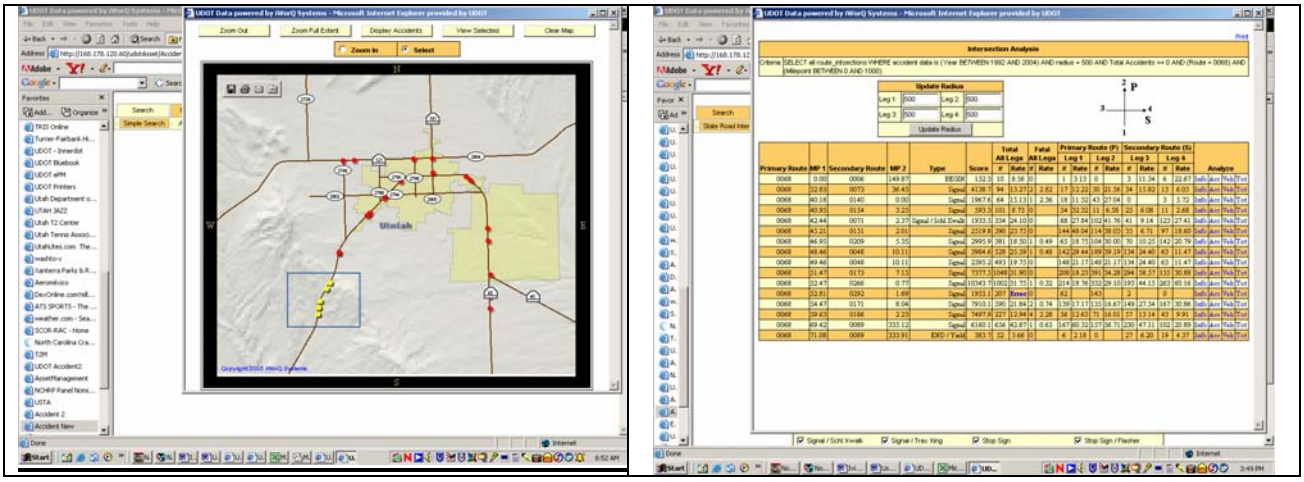
UDOT Data Almanac Training Sessions:

By: Doug Anderson, UDOT Research Division

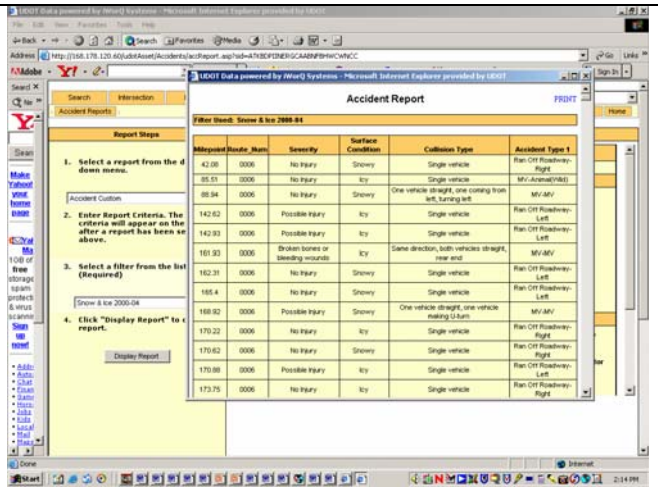
The latest version of the UDOT Data Almanac has been launched in the fall of 2006. Training sessions will be scheduled in each region and most UDOT divisions. The databases have been supplied by the Traffic & Safety Division and the Planning Division. This is an updated, second version of the web site that will deliver the following to your desk:

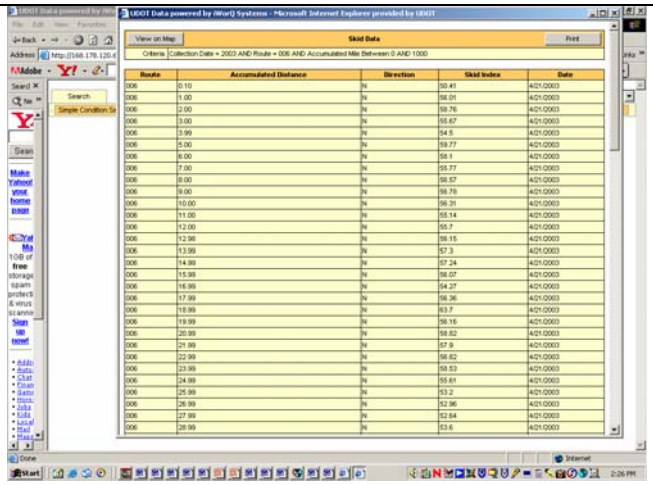
- **Crash Data**
- **Pavement Condition Data**
- **Traffic Data**

Crash Data can be queried in any way you would like to see it, and capabilities include various types of searches, Cluster Analysis, Intersection Analysis, GIS Mapping and Retrieval capabilities, and Custom and Canned Reports.

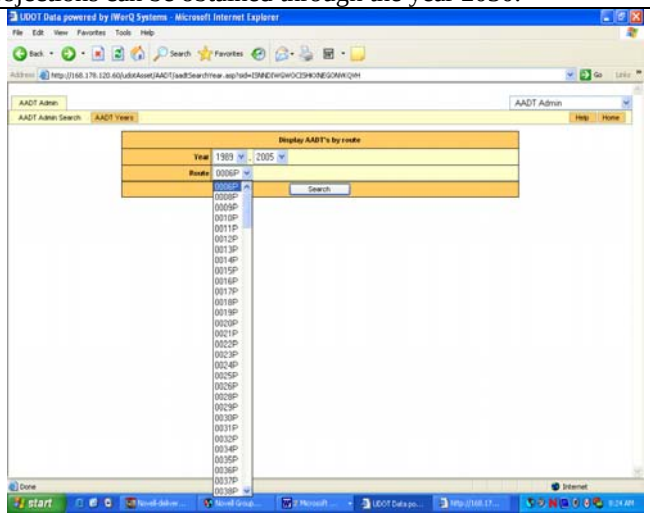


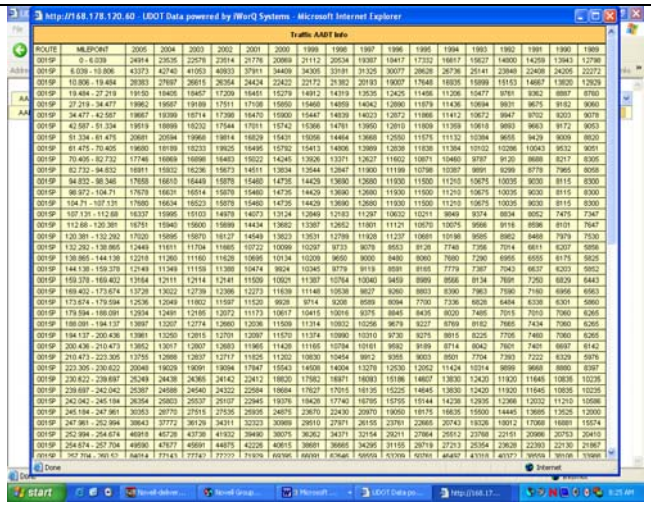
Pavement Condition Data can be downloaded in four different ways: Simple Search, Trend Analysis (from 1997 to 2005), Section Information (ride, ruts, skid number, cracking and patching), and System (Deficiency) Searches.





Average Annual Daily Traffic Data (AADTs) can be downloaded for the years 1989 to the present. Future traffic projections can be obtained through the year 2030.





If you would like to schedule training for your region or division on the UDOT Data Almanac, contact Doug Anderson, Research Project Manager. 801-965-4377, dianderson@utah.gov

Transportation Research:

By: Michael Fazio, UDOT Research Division

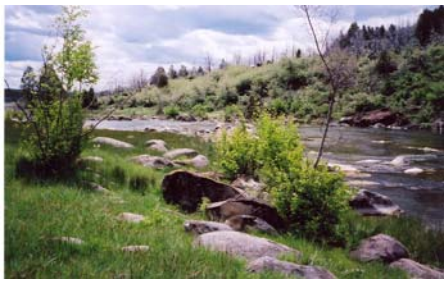
In today's competitive world many industries would have vanished if they did not invest in research. Research and Development is the right arm of companies in the aerospace, medical, and agricultural and many other businesses. The Transportation industry, traditionally conservative, is realizing that to meet the demands of the future population we need to find better and more efficient ways to move people from A to B. We have many different constraints, from environmental to space and funding and limited natural resources that limit our ability to provide traditional transportation. We need ideas, which stretch our imagination. The future in transportation will not be tied to cars or trucks only. It's up to us to find a better and safer way.

Making the Most of Wetlands:

By: Blaine Leonard, UDOT Research Division

Understanding how wetlands function allows us to preserve and replace them more effectively. In early 2006, a three-year study of Utah wetlands and their functions was concluded, yielding a Functional Assessment Method (FAM) specifically for use on highway projects in Utah.

Jurisdictional wetlands exist in many places in Utah, including along and near many of our highways. These wetlands are identified using Army Corps of Engineers methods. When these wetlands are impacted by our highway projects, we must minimize the impacts, by changing the design or replacing the wetlands. In the past, it has been a challenge to uniformly understand the role each wetland plays in the environment, so that these wetland functions can be enhanced or adequately replaced. A wetland that supports migratory birds, if not properly evaluated, might be replaced by a wetland which enhances surface water quality, but does not benefit birds. This problem was identified during the UTRAC Workshop in 2001, and a research project was initiated to find a solution.



A large team of environmental specialists was assembled in 2003 to develop a plan for a functional assessment method. This team included environmental engineers and landscape architects from UDOT, wetland specialists from the Army Corps of Engineers (COE), a wetland biologist from the Utah Division of Wildlife Resources, and a specialist from the Montana Department of Transportation. The team was led by Dr. Craig Johnson from Utah State University, and several graduate students. Through a series of workshops, site visits, and evaluations, the team modified a method developed in Montana for use in Utah. Wetland consultants were brought in to learn the system, and evaluations of several wetland sites were compared to determine if the system can be uniformly applied. After these evaluations, the COE indicated that the method was acceptable for use in Utah.

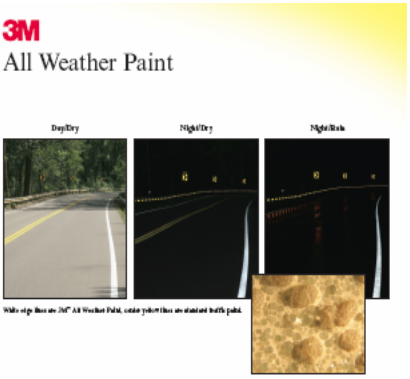
The intent of this method is to provide a science-based, rapid, economical and repeatable way to evaluate wetland functions which minimizes subjectivity and variability. It is important that the values and functions inherent in an individual wetland be quantified, so that mitigation can be properly applied. The wetland functions include biological (including support of endangered plants and wildlife) and hydrological (flood attenuation, sediment and nutrient removal, and shoreline stabilization). The values include visual quality and recreation. The intended objectives of the study were met, and our environmental engineers and landscape architects, within the Department and in the consulting community, now have a valuable tool.

The UDOT FAM is contained in a written manual, found on the UDOT Research web site (Report No. UT-06.12), and it's uses are described in a field evaluation report, also found on the web site (Report No. UT-06.13). For more information about this new method, contact Terry Johnson, in UDOT's Environmental Division TERRYJOHNSON@utah.gov, or Blaine Leonard, the Research Division project manager. BLEONARD@utah.gov

New Traffic Marking for Wet Night – a Marriage of Ennis Paint and 3M:

By: Richard (Barry) Sharp, UDOT Research Division

Historically the Utah Department of Transportation has used and tested many traffic markings and to date there is none that have a wet night retro-reflective ability. A wet night reflective traffic marking may be the holy grail of traffic marking.



Ennis Paint, the premier waterborne traffic marking paint manufacturer, has joined forces with 3M in developing a waterborne traffic marking that has reflective capabilities when it is completely covered with water. This type of traffic marking is potentially a long life product with remarkable reflective presence when applied to pavements. 3M has developed a multiple reflective element when added to the Ennis Paint waterborne marking that increases the ability to reflect head-lights even through a water medium.
On September 12, 2006 Interstate/Ennis/3M installed this product on I-215 eastbound beginning at 300 East ending at approximately 1700 East. Only outside solid lines were installed. Solid yellow for the inside and solid white for the outside were applied. Retro-reflective readings were taken on September 13, 2006 with a hand held LTL Wet Reflective machine. The white lines averaged 450 mille-candelas and the yellow readings averaged near 100 mille-candelas.

On a rainy day of September 20, 2006, Mr. Barry Sharp, UDOT New Products Coordinator, drove the test site and visually inspected the paint. It appeared that both the yellow and white paints were visible from at least 400 feet without other lighting.

Tune in for further evaluation and reporting on this new product. If you have questions about test results on other products, or have suggestions for future product testing, please contact Barry Sharp @ rsharp@utah.gov or (801) 965-4314.

In The Know

A Look At Who We Are

By: Abdul Wakil, UDOT Research Division

An ongoing feature of our quarterly newsletter is an introduction to one of our Research and Development Division staff members. In this edition, we will introduce you to Mr. Doug Anderson and Mr. Chase Njord.
Mr. Anderson has spent most of his 36-year career at UDOT in the Research Division. He has served in the past as the Division Head in both Research and Planning. He holds both a Bachelor's and Master's degree from the University of Utah in Civil Engineering. He is currently a Research Project Manager on 16 projects related to Materials, Pavements, Safety, Web Data Delivery and Policy Research. Doug is always willing to help and answer your questions and you can contact him at (801) 965-4377 or DIANDERSON@utah.gov

Mr. Chase Njord is our Engineering Intern and he is currently attending Salt Lake Community College as a sophomore. Alongside of his other assignments, Chase is currently working on creating a database to store research division budget and projects information. Mr. Njord is planning on majoring in Mechanical Engineering. He likes to explore mechanical devices and loves to figure out how they work. He loves working on cars and altering them to fit his style. He also enjoys welding, swimming, and riding motorcycles. His favorite holiday is Halloween. Chase likes to learn new things and hopes to learn many during his time here at UDOT. You can contact him at CNJORD@utah.gov or (801) 965-4790.

Completed UDOT Research

Research publications are valuable resources, documenting the results of important research projects. For a list of recently completed Research Projects, please visit the Research & Development website at: http://www2.udot.utah.gov/index.php?m=c&tid=235. If you would like to obtain an electronic copy or a printed copy of our completed research, please contact awakil@utah.gov.

Need a Literature Search?

The UDOT Research Division and Lester Wire Library provide an important service through literature searches. These searches help identify published information about a topic of interest. To request a search, provide a brief description and some key words and submit it to awakil@utah.gov. Or you can submit your request online @ http://www.udot.utah.gov/index.php/m=c/tid=895/

Please send your comments and questions about this Newsletter to Abdul Wakil awakil@utah.gov or (801) 964-4455